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THE VALUE OF A FULL RATION FOR THE DAIRY COW

N. C. State College of Agriculture and Engineering, N. C. State Department of Agriculture, N. C. Agricultural Experiment Station, and U. S. Department of Agriculture, Cooperating

AGRICULTURAL EXTENSION SERVICE

B. W. KILGORE, *Director*

West Raleigh and Raleigh

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Score Card for Mules

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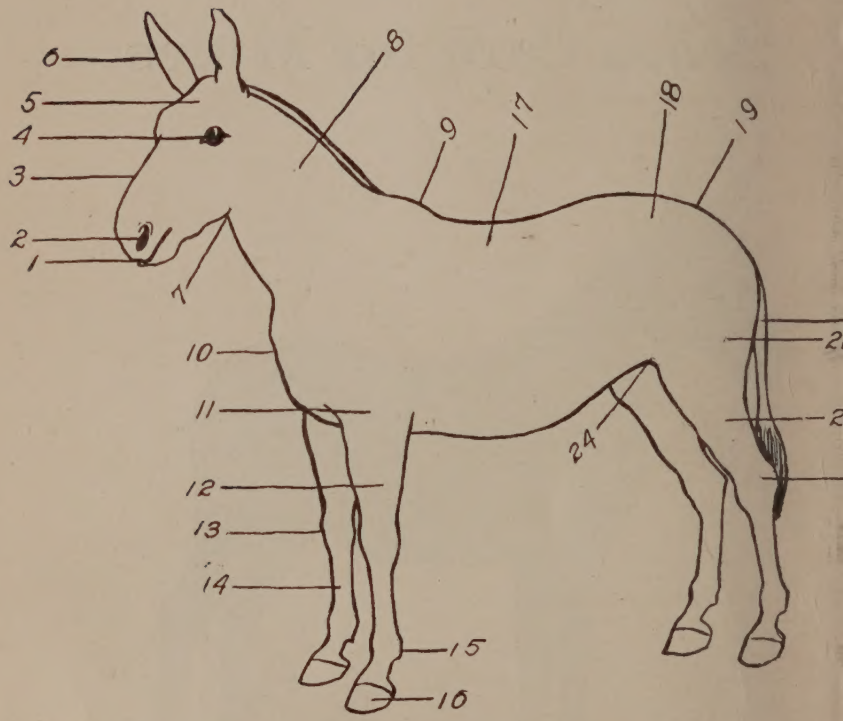
SCORE CARD FOR MULES

By EARL HOSTETLER, *Animal Industry Division*



Key to Outline

1. Lips
2. Nostril
3. Face
4. Eye
5. Forehead
6. Ears
7. Throat-latch
8. Neck
9. Withers
10. Breast
11. Arm
12. Fore-arm
13. Knee
14. Cannon
15. Fet-lock
16. Foot
17. Back
18. Hips
19. Croup
20. Tail
21. Quarter
22. Gaskin
23. Hock
24. Stifle

	Perfect Score	Your Score	Judge's Score
GENERAL APPEARANCE—16 Points.			
Weight: score according to age and type.			
Height: 14 hands and up; estimated_____hands; actual_____hands	4		
Form: symmetrical, smooth	4		
Quality: bones clean; tendons defined; skin and hair fine,	4		
Temperament: energetic; good disposition	4		
HEAD AND NECK—6 Points.			
Head: well defined; medium size	1		
Muzzle: fine; nostrils large; lips thin and even	1		
Eyes: full, bright, clear	1		
Forehead: flat, broad, full	1		
Ears: large, well carried, tapering	1		
Neck: muscled, crested; throat-latch defined; windpipe large	1		
FOREHEAD—21 Points.			
Shoulder: long, sloping, well muscled	2		
Arm: short, muscled, thrown well forward and backward; forearm well muscled, long, wide	3		
Knees: wide, clean, straight, deep, well supported; canons short, wide; tendons well defined	4		
Fetlocks: wide, straight, strong; pasterns short, clean, straight; angle with ground, 45 degrees	4		
Feet: size medium, even; horn dense; sole concave; bars strong; frog prominent, elastic; heel wide, high	6		
Withers: smooth, well muscled, continuous with neck and back	2		
BODY—8 Points.			
Chest: deep, low; girth large	1		
Ribs: long, sprung close	2		
Back: straight short, well muscled	2		
Loins: wide, s,hort, thick	2		
Underline: long; flank low	1		
HINDQUARTERS—29 Points.			
Hips: smooth, wide, level; croup wide, muscular	4		
Tail: attached high, well carried	1		
Thighs: long, well muscled, open angled	2		
Quarter: heavily muscled, deep	2		
Gaskins: wide muscled	2		
Hocks: wide, well defined, strongly supported, straight; canons short, wide; tendons set well back	9		
Fetlocks: wide, straight; pasterns short, angle with ground 55 degrees	5		
Feet: medium size, even; horn dense; frog prominent, elastic; bars strong; sole concave; heel high, wide	4		
ACTION—20 Points.			
Walk: smooth, stride long, active; trot rapid, straight regular	20		
Total	100		

STUDENT'S NAME_____

DESCRIPTION OF THE MULE.

General Appearance:

The general requirements for mules are essentially the same as those for draft horses. However, the body is more cylindrical in shape and smaller than that of the horse.

Mules that are fat and have plenty of quality and style usually command a better price than those that do not possess these qualifications. Buyers also usually prefer a mule with a solid color.

Height and Weight:

While there is considerable variation in height and weight, large draft mules usually sell for a better price than smaller mules of the same quality.

Strength and Endurance:

Strength and endurance are indicated by well muscled hind quarters, deep chest, large body and good feet and legs. While the body should be large it should be paunchy.

Action:

The action of a mule is especially important. Since most of his work is done at a walk the stride should be long, even, and regular.

Disposition:

A mule that has an even temperament and is easily handled will do his work easier and better than one that is nervous or vicious.

THE VALUE OF A FULL RATION FOR THE DAIRY COW

By Stanley Combs

Milk and its products represent, at the present time, about 20 per cent of our entire diet. These foods supply fat that promotes growth, proteins of exceptional quality, carbohydrates equal and possibly superior to those of other foods, ideal mineral matter, and the vitamines that are so essential to growth, health, and vigor. Milk is a perfect and a complete food. It is nature's greatest food product and our best qualified authors tell us that it should form over 40 per cent of our diet. In North Carolina this is impossible with the present number of dairy cows and the methods under which they are handled.

In her wild state all that was required of the cow was that she produce milk enough to feed her offspring. By taking advantage of the all-powerful impulse of motherhood for the preservation of the young of the species, man, through careful selection of individuals, liberal feeding, and general good management, has stimulated her to produce more milk than is needed by the calf, were it still the object of her care. Therefore, our present dairy breeds represent the efforts toward improvement made by several generations of breeders. The highly developed dairy cow of today may be likened to a machine or a manufacturing plant that consumes the hay and coarser grains produced on our soils, and converts them into a highly nutritious human food. Her successful feeding from an economical standpoint involves many perplexing problems.

A certain portion of the power furnished any machine is used for running the machine itself and is in no sense productive. In the engine this is represented by the power necessary to overcome the friction caused by the working parts. In the factory this is represented by the managerial and clerical forces. These forces are necessary, and they are the first to be furnished, but they are unproductive. In the cow the feed which supplies this unproductive force is called a "maintenance ration," and it is that portion of the feed which is used by the cow to perform her own functions such as maintaining the body temperature, the pumping of the blood, digesting the feed, and moving the body from place to place. After this demand is supplied, any excess may be used for producing milk. The maintenance ration for a cow at full work is a fixed charge and the more feed she can handle above that required for maintenance, the greater amount is available for production.

FEEDING FOR MILK PRODUCTION

There are two factors which control the economical production of milk. One is the adaptability of the cow used, and the other is the amount and kind of feed consumed. The problem that confronts the

dairymen today is the production of that amount of milk which will produce the greatest profit from the amount of feed, labor and capital expended. In order to realize this, both of the above mentioned factors must receive careful consideration. Every dairyman welcomes the time in the spring when the cow can be turned out on pasture, as she is expected to produce the best results of the year during this time. If these conditions are such that produce the best results, then the greatest profit may be expected by furnishing, so far as is possible, these summer conditions throughout the year. During this season nature supplies the animal with an abundance of palatable, digestible, succulent food, fresh air, water, and comfortable surroundings. A great many dairymen do not realize the importance of these conditions and fail to provide them for the herd. Many herds throughout the State fail to pay a profit because they are not properly fed. This fact is clearly emphasized in the handling of the experimental herd of Jerseys near Willard, N. C.

During 1917 there were eleven mature cows in this herd ranging in age from 5 to 12 years. Following the date of freshening, records were kept of all feeds consumed by each animal for a period of twelve months. The following year these same cows were given a full ration and a similar record kept for twelve months. Table No. 1 shows the amount of milk and fat produced by each of these cows during the first year, and the amount of the different kinds of feed consumed by each in addition to six and one-half months pasture.

TABLE No. 1.

Name of Cow	Milk, Pounds	Fat, Pounds	Concentrates, Pounds	Dry Roughage, Pounds	Succulent Feeds, Pounds
Nig	5353.3	273.38	2205	2464	3942
Fern	4400.8	230.48	1900	2034	3400
Ola	4499.0	197.98	2127	2230	3590
Dinah	3556.0	169.65	2485	2034	3652
Delia	5123.1	257.15	2232	1860	3590
Grace	3628.8	182.22	1953	2058	3155
Emily	4355.7	216.81	2033	2034	3440
Lady	4398.6	196.59	2032	1908	3270
P. Girl	3758.6	173.04	1826	2598	3483
Fannie	3469.8	159.57	1723	2344	3348
Queen	4094.3	206.00	2051	2034	3710
Average	4239.8	205.72	2052	2145	3507

A glance at this table shows that these cows were not consuming as much feed as may be expected of well matured cows. The production of milk and fat is likewise low. As these same cows freshened in 1918 they were put on a ration composed of the same feeds fed in different proportions. They were fed twice each day and given all they would consume. Table No. 2 shows the amount of milk and fat produced by each one of these animals for the twelve months period following the date of freshening.

These cows produced an average of 4,239.8 pounds of milk containing 205.72 pounds of fat during 1917. See Table No. 1 for the amount of feeds consumed.

When on full feed these cows produced an average of 7,125 pounds of milk, and 351.81 pounds of fat, an increase of nearly 70 per cent over their record for the previous year. See Table No. 2 for the amount of feeds consumed.

TABLE No. 2.

Name of Cow	Milk, Pounds	Fat, Pounds	Concentrates, Pounds	Dry Roughage, Pounds	Succulent Feeds, Pounds*
Nig	6994.8	325.01	3109	1158	7506
Fern	6901.5	352.02	3213	1406	7203
Ola	6381.3	306.74	3197	1250	7457
Dinah	6116.2	299.38	3267	1406	7192
Delia	8158.2	423.21	3735	964	7720
Grace	7210.9	374.21	3130	1399	6822
Emily	7588.0	368.43	3030	1420	7315
Lady	7671.7	381.99	2973	1504	6697
P. Girl	8442.1	417.63	3930	1158	7599
Fannie	5667.6	264.59	2238	1277	7514
Queen	7247.3	356.68	2539	1406	6938
Average	7125.4	351.81	3124	1304	7269

In comparing this table with Table No. 1, it is noticed that the milk production was increased over 68 per cent. The fat production shows an increase of 70 per cent. During this year's work pasture was supplied eight months instead of six and a half, as shown in Table No. 1.

THE AMOUNT OF FEED

There are several purposes for which the cow may use her food. The first requirement is to maintain the body. After this is accomplished she may use the surplus for any of the following purposes:

1. To produce milk.
2. For growth in case she is immature.
3. To lay on flesh.
4. For the development of the fetus.

One of the main problems in the economical production of milk is in the selection of a cow with an ability to handle a large amount of feed. The ordinary dairy cow requires a little over one-half of all she can consume for maintenance. In the case of a cow producing 400 pounds of fat per year or more, only about 40 to 50 per cent of all she can consume is required for maintenance. It is quite evident that, after going to the trouble and expense of securing a cow and supplying her with the amount of feed necessary to keep her alive, it is poor judgment not to supply her with the other 50 to 60 per cent of the ration which she may use exclusively for producing milk. This mistake is made with about 50 per cent of the dairy cows of North Carolina, and the heavier producing cow is usually the one to be under fed. The importance of supplying a cow with a full ration may be illustrated with the following diagram:

A !—Maintenance Ration C Ration available for ! Milk production. B !

Full ration.

D !—Maintenance Ration F Ration Available for milk Production E

Three-fourths Ration.

*Pasture was provided all cows for a period of eight months during the year.

Line A-B represents a full ration. That part of the line A to C represents the amount of ration required for maintenance. Therefore, that part from B to C is available for milk production. If the cow's ration were decreased 25 per cent she would be expected to produce according to the second illustration. Line D-E would then represent the total amount of feed she consumes. As stated elsewhere, the requirement for maintenance is practically a fixed charge and is that portion of the line D-E from D to F, leaving only that part of the ration represented by the line E-F for milk production. Thus, a cow receiving only three-fourths of a ration would be expected to produce about one-half as much milk as she would if given a full ration. By referring to tables Nos. 1 and 2, it will be noticed that these cows received during 1917 only about three-fourths as much feed as they did during 1918. In 1918 their milk production was increased 68 per cent, while the cost of production was decreased, showing that the cows produced most economically while receiving a full ration.

The amount of succulent feeds was more than doubled. The amount of dry roughages was increased over 60 per cent. Table No. 3 shows the amount of the different classes of feeds consumed for each one hundred pounds of milk produced during the two-year test.

TABLE No. 3

	Table No. 1	Table No. 2
Concentrates	48.4 lbs.	43.8 lbs.
Dry roughage	50.4 lbs.	18.3 lbs.
Succulent feeds	82.7 lbs.	102.2 lbs.
Pasture	4.6 days	3.4 days

Table No. 3, showing the amount of feeds required to produce 100 pounds of milk during the first and second years, as derived from Tables Nos. 1 and 2.

Assuming that the concentrates cost an average of $80 per ton, the dry roughage $40, succulent feeds $12, and pasture 5 cents per day, then the feed cost is $3.67 to produce 100 pounds of milk during the first year while the cows were not receiving a full ration. Applying these same prices to the feeds required to produce 100 pounds of milk during the second year when the cows were on a full ration, it is found that the cost is $2.90, thus reducing the cost 77 cents per 100 pounds of milk with feed alone. This may not seem very large, but it is worth consideration. This milk sold for $5 per 100 pounds f. o. b. the farm. The profit per cow above the cost of feed during 1917 was $56.39. The reduction in feed cost of 77 cents per 100 pounds of milk realized the second year, together with the increased production, resulted in a profit of $149.63 per cow. The increased profit per cow resulting from the better feeding was $93.24. On the herd of eleven cows this amounted to $1,025.64.

Recent studies on the cost of milk production in North Carolina show that the feed cost represents about 54.8 per cent of the total cost of production.*

Since the cows, barn, and all equipment were the same during the two years, that part of the overhead cost remained the same. However, the greater milk production obtained the second year would lessen these costs per 100 pounds of milk. The cows were fed and milked twice a day during each year. The only noticeable difference was the amount of time required to feed thirty pounds of silage, instead of twenty-five, eight pounds of concentrates, instead of six, the milking and handling of 8 gallons of milk, instead of 5, and so on throughout the various operations. This increased cost is more than offset by the increased milk production.

*North Carolina Agricultural Department Bulletin, March Supplement, 1920, "A Study of the Factors Involved in Producing Milk in North Carolina."